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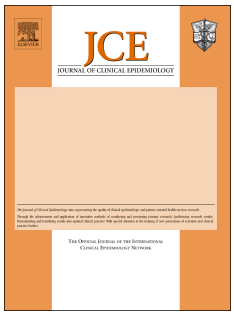

Essential medicines availability is still suboptimal in many countries: A scoping review

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Essential medicines availability is still suboptimal in many countries: A scoping review

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Abstract

Objective To identify uses of WHO Model list of essential medicines (EM) and summarize studies examining essential medicines (EM) and national EM lists (NEMLs).

Study design and setting In this scoping review, we searched PubMed, Scopus, WHO website and WHO Regional Databases for studies on NEMLs, reimbursement medicines lists, and WHO EML, with no date or language restrictions.

Results 3,144 retrieved documents were independently screened by two reviewers; 100 full-text documents were analyzed; 37 contained data suitable for quantitative and qualitative analysis on EMs availability (11 documents), medicines for specific diseases (13 documents), and comparison of WHO EML and NEMLs (13 documents). From the latter, 2 documents analyzed the relevance of evidence from Cochrane systematic reviews for medicines that were on NEMLs but not on the WHO EML. EMs availability is still suboptimal in low-income countries. Availability of children formulations and EMs for specific diseases such as chronic, cancer, pain and reproductive health is suboptimal even in middle-income countries.

Conclusion WHO EML can be used as a basic set of medicines for different settings. More evidence is needed into how NEMLs can contribute to better availability of children formulations, pain and cancer medicines in developing countries.

Key words World Health Organization, essential medicines, scoping review, availability, accessibility, Cochrane

Running title: Scoping review of essential medicines' use

What is new

This is the first scoping review on the use of essential medicines concept. Two bibliographical databases and WHO regional databases were searched to find all relevant studies on the implementation of essential medicines concept.

Key findings

Countries varied greatly in the alignment of national essential medicines lists to the WHO essential medicines list and availability of essential medicines. Essential medicines availability is still suboptimal in low-income countries.

What this adds to what is known

Availability of essential medicines for specific diseases such as chronic, cancer, pain (suboptimal use of opioid medicines), reproductive health, pregnancy and children care and orphan diseases is suboptimal even in middle income countries, and medicines for hepatitis C are insufficiently available around the globe.

What is the implication, what should change now

More evidence is needed into how NEMLs can contribute to better availability of children formulations, pain and cancer medicines in developing countries.

Introduction

Medicines are the second most important component of healthcare budgets, second only to salaries [1]. The World Health Organization (WHO) considers relevant choices of medicines as the most cost-effective health intervention after childhood immunization [2]. The concept that some medicines are more "essential" than others is as relevant to the world nowadays as it was in 1975 when it was developed [3]. Currently, 146 countries have accepted the Essential Medicines concept, which guides reimbursement of medicines on the basis of public health importance, efficacy, safety and cost [4]. In brief, the idea is that medicines of the highest public health relevance should be made available on equal basis to all members of a population for free or at an affordable price [3]. Since 1977, WHO has been updating its EML every two years, with the latest 20th version for adults and the 6th version for children updated in 2017 [5]. The WHO EML can serve as a model list for country specific national essential medicines lists.

National essential medicines lists (NEMLs) or reimbursed medicines lists are a key component of well-functioning health-care system [1]. NEMLs are the cornerstone of the national medicines policy; they should affect the pharmaceutical system at all levels: manufacturing, supply, prescribing and even donations, in order to guarantee individuals and populations all the medicines they really need [6,7]. NEMLs are developed and approved by the government of a country, and the most cost-effective medicines for infective and non-infective diseases should be included. Some countries have a unique NEML that is valid for the whole territory of the country, and other countries, especially those territorially diverse such as China [8], develop subnational/province/cantonal-level EMLs, based on regional needs and priority health-conditions to be treated. In smaller countries, such an approach could lead to inequality and discrimination [9].

The selection of NEML remains a country's responsibility, since the very concept is supposed to be flexible and adaptable to local circumstances [10].

Objective

We performed to a scoping review of the peer-reviewed and grey literature that aimed to reporting empirical data concerning EMLs in order to synthesizes the knowledge on practical use of EMLs and provide a baseline to influence further research on the topic at a global scale. Specifically, we aimed to identify uses of WHO Model list of essential medicines (EM) and summarize studies examining essential medicines (EM) and national EM lists (NEMLs). The scoping review methodology [11,12] was used because the topic of EMs is complex and heterogeneous in nature and not amenable to a focused systematic review. We followed the methodology and guidance for the conduct of scoping reviews developed by members of the Joanna Briggs Institute and members of five Joanna Briggs Collaborating Centres [11]. We wrote a brief protocol for the scoping review (Supplementary document 1) but we did not register it.

Methods

Search strategy

The search focuses on the following concepts: 1) Selection process, priority setting, methodology, expansion of the EMs list, policy; 2) Use, implementation, prescribing patterns; 3) Economic evaluation; 4) Impact, patient outcomes; 5) Pros and cons, attitude and opinion towards EMs formulary; 6) Specific diseases or group of diseases; 7) Alignment, rational use, prescribing practices, prescribing patterns; 8) EMs in the developing countries (middle and low income); 9) Availability, accessibility, supply of EMs (procurement) and 10) Critical comparison WHO EML – NML. Retrieved documents were coded in one or multiple categories by two evaluators (MMK, AJK). Topics excluded from analysis were the following: 1) General analysis/review, without empirical data; 2) Guidelines; 3)

Modelling studies; 4) Technical report series (TRS; interventions in WHO EML); 5) Patents; 6) Bioequivalence studies and 7) EMs in emergency situations 8) lower than national level. In cases of disagreement, the third researcher was consulted (AM) and the differences were resolved by consensus. After defining concepts to be addressed in the scoping review, the primary search strategy was developed (AM) in consultation with an experienced librarian (AU), and conducted without time or language restrictions. We searched PubMed and SCOPUS on 25 November 2015. The PubMed search strategy was: "world health organization"[All Fields] AND ((essential medicine[All Fields] OR essential medicines[All Fields]) OR (national list[All Fields] OR national listing[All Fields] OR national lists[All Fields]) OR (reimbursement[All Fields] OR reimbursement'[All Fields] OR reimbursement's[All Fields] OR reimbursement features[All Fields] OR reimbursement for[All Fields] OR reimbursement intelligence[All Fields] OR reimbursementn2qod[All Fields] OR reimbursements[All Fields] OR reimbursements'[All Fields] OR reimbursement specialist[All Fields])), and was adapted for SCOPUS. The search was repeated on 4 December 2017, using the same search strategy. The search output was transferred to Endnote X5 for Windows (Thomson Reuters, 2011), and de-duplicated. Two reviewers (MMK, AJK) checked the titles (and abstracts if available) for inclusion criteria. Further exclusions were performed after reading the full text of the documents.

We also searched the grey literature, including the World Health Organization [13] website, as WHO provides leadership in global matters concerning global health, especially medicines, and articulates evidence-based policy options [14]. We searched WHO Essential medicines and health products information portal („Essential Medicines and Health Products Information Portal Medicine access>Rational Use“), as well as WHO Regional Databases: African Index Medicus – AIM, Index Medicus for the Eastern Mediterranean Region – IMEMR, Index Medicus for the South-East Asian Region – IMSEAR, Latin American and Caribbean Health Sciences Literature – LILACS, Western Pacific Region Index Medicus – WPRIM. The search was performed on 8 February 2016, using the key terms

"essential", "medicine(s)", "drug(s)", "WHO". The same exclusion criteria were used as in the database search, and reports, resolutions and technical discussions were excluded. A liberal accelerated model [15] was used to search the gray literature, in which one reviewer (MMK) selected potentially inclusive titles, and the other (AJK) checked rejected titles for potential inclusion. Disputes were solved by agreement and consultation with the third researcher (AM).

Analysis

After finding the most frequent concepts, these were further refined, and investigated: availability of EMs in general, availability of EMs for specific diseases, and critical comparisons of WHO EML and NEMLs. For documents that reported on the content of EMLs, we analyzed the number of medicines that appeared only on the WHO Model list of essential medicines (EML), medicines that only appeared on NEMLs, medicines presented on both the WHO EML and NEMLs. We also reported the alignment (adherence) index or calculated it in cases where it was not reported but the document contained the data to allow the calculation. The alignment index was defined as number of medicines present both on WHO EML and NEML compared to number of medicines present only on an NEML [16] accompanied with the interquartile range (IQR) of the alignment index. All documents that contained data comparing the WHO EML and NEMLs, whether primary or secondary research studies, were used for data extraction. The data extraction for critical comparison of the WHO EML and NEMLs was done for the latest version of NEML available. If a country's NEML was analyzed in several documents, the most recent document was included. Data extraction for included studies where some of the authors were involved was performed by non-involved authors.

Since Preferred Reporting Items for Systematic Reviews and Meta-Analysis: extension for Scoping Reviews (PRISMA-ScR) are still being defined [17], we used the applicable items from the PRISMA checklist [18] for reporting.

Results

In total, 3,144 documents were screened and 100 full text documents were analyzed by three reviewers (MMK, AM, KC) after deduplication (**Figure 1**). The most frequent concepts that emerged in these documents were: availability/accessibility of EMs (68 documents), EMs in low- and middle-income countries (65 documents) and EMs for specific diseases (49 documents). 15 documents (published from 2006 to 2017) compared WHO and national EM lists (NEMLs). We excluded 63 documents which were out of the scope of the review (**Supplementary Table 1**).

We analyzed 37 full documents that contained data suitable for quantitative or qualitative analysis: 11 documents on the general availability of EMs, 13 documents on availability of EMs for specific diseases, and 13 documents on head-to-head critical comparisons of WHO EML and NEMLs (See **Supplementary Table 2** for the list of included studies).

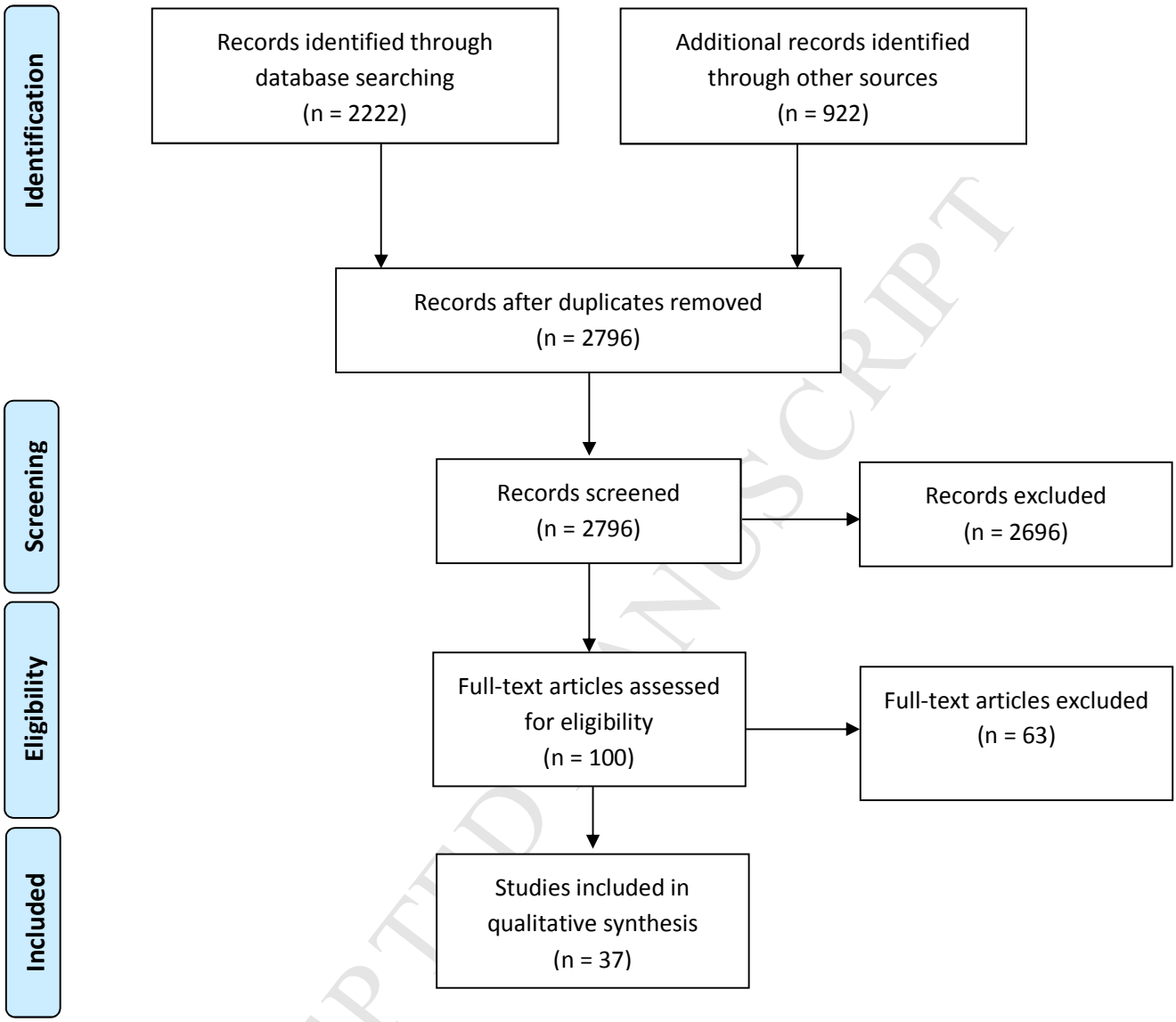

Figure 1. Flow chart of the scoping review. Reasons for exclusion of 63 articles are presented in Supplementary Table 1.

In total, 11 documents reported on EM availability [19-29]. EMs availability (**Table 1**) remains suboptimal in low-income countries, while the situation is better in middle income countries, especially concerning generic EMs. Provision and availability of EMs (measured using WHO/Health Action International (HAI) methodology and WHO operational package for monitoring and assessing country pharmaceutical situations) [30,31] has improved (over 2003-2011 time period) compared to non-EMs in low- and lower middle-income countries, especially in the public sector, although availability still has not ensured equitable access [19]. In Sub-Saharan Africa, EMs contributed to the reduction of morbidity and mortality for the past 30 years, measured by infant mortality (which significantly dropped with the increase of measles and DTP immunization coverage) but EMs availability in public facilities remains alarmingly low [16].

Availability of EMs for specific diseases

13 documents reported on availability of EM for specific diseases or populations. Availability of inhaled corticosteroids, pain medicines (especially opioid), cancer medicines, hepatitis C medicines, medicines for reproductive health and children formulations was found to be suboptimal (**Supplementary Table 3**) [32-44].

Alignment of NEMLs to the WHO EML

NEML's alignment with the WHO EML was reported in 13 documents (summarized in **Table 2**) [2,6,8,9,16,45-52]. The median number of medicines on NEMLs was 339, and ranged from 218 in Djibouti to 627 in the Philippines. The dates of the NEMLs ranged from 2006 to 2013. The average number of medicines that were at the same time on the latest NEML and the closest version of the WHO EML was 194, and ranged from 124 in Bosnia and Herzegovina to 283 in the Philippines. The number of medicines which were only on the NEML varied from 164 (Bosnia and Herzegovina) to 495 (Mexico), median 318. The number of medicines found only on the WHO EML ranged from 92 in Bosnia and

Herzegovina to 301 in Malawi (median 223). The median alignment index was 0.46 (interquartile range 0.41 to 0.57). The lowest indices of alignment were reported in Brazil and Mexico (0.31), and the highest in Indonesia (0.79).

Although Brazil had a special EML for children, there was a lack of special formulations of EMs even for indispensable therapeutic medicines for severe clinical conditions [45]. The number of special formulations for children was also reported less than needed for the burden of disease in China [53, 54] and South Africa [52].

We found two documents in which the use of Cochrane systematic reviews was analyzed to evaluate the evidence base for the medicines on the NEML in two countries [9, 47]. In these documents, the use of the Cochrane Database of systematic reviews was tested in addition to the WHO EML in revising NEMLs: one in a high income non-OECD country (Croatia) and the other in an upper middle-income country (Bosnia and Herzegovina). The Cochrane Database of systematic reviews provided high quality evidence for 42 (8.3%) and 38 (11.4%) medicines (same or more benefits, including ones with serious side effects) justifying their inclusion on the NEML in these two countries, respectively. The Cochrane Database of systematic reviews provided evidence for exclusion from the NEML for 14 (2.8%) and 16 (4.8%) medicines in the two countries, respectively.

Discussion

EMs availability is still suboptimal in low- and middle-income countries, especially for specific diseases and populations including chronic diseases, reproductive health, pregnancy care, child health, cancer, and pain (low availability of opioid medicines and excessive NSAIDs availability). Hepatitis C medicines are not sufficiently available even in high-income countries.

NEMLs differed greatly from the WHO EML. One reason is that a small number of developed countries formally used the WHO EML as a guide in the development and implementation of national

medicines policies [6]. Furthermore, country standard treatment guidelines also do not align with the WHO EML [6].

Other possible reasons could include different epidemiological circumstances worldwide concerning both communicable and non-communicable diseases, and some differences are expected and justifiable [8, 10]. Not all medicines are licensed in all countries due to different national medicines' policies [9] and different strategic and marketing policies of medicines manufacturers. That is why the WHO EML was not intended to be reproduced on every NEML, but rather to serve as a guide to save costs and increase rational medicines availability and prescribing.

The implementation of the concept of EMs has significantly reduced morbidity and mortality in many countries of the world in the past 30 years, particularly in developing countries [16], but still one third of the world population lacks reliable access to EMs [30]. Many EMs are available globally [55], partly due to the significant increase of the use of generic medicines, which has increased the availability of EMs. The concept of NEMLs is best developed in Africa and Southeast Asia, where almost all countries have adopted an NEML [8]. Nevertheless, according to the WHO, around 10 million lives could be saved annually by improving access to EMs, nearly half of those in Africa and South-East Asia [56]. Although the concept of EMs is widely accepted, and the need for periodic update is an important part of this concept, more than a third (36.8%) of low and middle-income countries assessed in 2014 have not updated EML between 2000 and 2012 [57].

Cochrane is an NGO in official relations with WHO [58] and has been striving to increase the use of Cochrane reviews to support decisions about additions or deletions of medicines to the WHO EML. In total, 177 reviews from 40 Cochrane Review Groups (range 1 to 19 reviews) have been used to inform all nine Reports of the WHO Expert Committee on the Selection and Use of Essential Medicines (including the WHO Model List of Essential Medicines and the WHO Model List of Essential Medicines for Children)

(range 2 to 41 reviews per report), published between 2000 and 2015 [59]. However, the WHO EML considers not only evidence of efficacy and harm, but also cost and regulatory status of medicines. Since the financial power of countries' health-care systems varies worldwide, it is useful to consult the Cochrane Database of systematic reviews when making decisions on an NEML if financial resources and appropriate expertise are available [9,47].

The risk of bias/critical appraisal is not recommended for scoping reviews [11], so we did not formally evaluate the risk of bias. One of the included studies was a review without a defined systematic search strategy and with a high risk of bias due to the commercial nature of the company publishing the document [6]. It had undefined financial support for conducting the review and undisclosed other conflicts of interest.

The findings of this review should be interpreted with respect to several limitations. As we did not impose time limits to the search, some of the time-dependent variables and data are outdated. Although formal quality assessment could not be done for these studies, their quality could be considered low according to their weak designs (observational, cross sectional). Some studies on the availability or affordability of EMs used the standardized WHO research methodology [30,31]; other studies used very heterogeneous research methodologies, which made the analysis difficult. EM concepts keep evolving and the situation changes over time as medical policies change globally and locally. Furthermore, only two bibliographical databases were searched in this study, leaving the possibility that we might have omitted peer-reviewed studies on this topic that were not indexed on these databases. It was also impossible to cover all grey sources of data, so some of the evidence may still be missing, even in high-income countries, which had the highest transparency of the selection process of reimbursed medicines. Also, another librarian had not peer reviewed the literature search

using PRESS [60], which is a possible limitation. We wrote the protocol for the scoping review, but did not formally register it, which may present a limitation.

In conclusion, the WHO EML has helped the development of the EM concept worldwide, but more evidence is needed regarding how NEMLs can contribute to improving the availability of age-appropriate formulations for children, as well as pain and cancer EMs, especially in developing countries.

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Conflict of interest statement

Four of the authors (MMK, AJK, LB and AM) were also authors on documents included in the scoping review. In order to avoid potential bias, data extraction was performed by the researcher who did not author that particular document, in order to avoid bias.

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Table 1. Availability of essential medicines (n = 11 articles)

Author Year	Title	Country	Income	Finding	Methodology used for establishing availability
Bazargani 2014	Essential medicines are more available than other medicines around the globe	Bolivia, Brazil, Cameroon, Chad, China, Congo, Ethiopia, Ghana, Indonesia, Kenya, Malaysia, Mali, Mexico, Nicaragua, Nigeria, Pakistan, South Africa, Tajikistan, Tanzania, Thailand, Uganda, Yemen, India	L, M	In all sectors of the mean availability of medicines was found suboptimal 61.5% (IQR 20.6% -86.7%) but significantly higher for non-essential medicines, 27.3% (IQR 3.6% -70.0%). Mean availability of essential medicines was 40.0% in the public sector and 78.1% in the private sector; compared to 6.6% and 57.1% for non-essential medicines respectively. The availability of medicines in the public sector was lower in countries with lower revenue.	WHO and Health Action International (WHO/HAI)
Chahal 2013	Availability, prices and affordability of essential medicines in Haiti	Haiti	L	The availability of EMs was low, and the prices are very varied across sectors. More than 75% of Haitians live on less than 2 US $ / day; and most of the medicines were unavailable. The inclusion of medicines on the NEML and cooperation with the organizations responsible for the importation of medicines in Haiti, in particular the humanitarian organizations are the most important steps in ensuring access to medicines.	WHO and Health Action International (WHO/HAI)
Cheraghali 2004	Evaluation of availability, accessibility and prescribing pattern of medicines in the Islamic Republic of Iran	Iran	UM	Good availability of medicines in pharmacies in the public sector. Management of medicines is good, the quality of storage meets the standards, limits the duration acceptable, and the quantity of drugs with expired expiration dates small. Centralized procurement and distribution of medicines contribute to it. An information service of the Ministry of Health actively provides information about the safe and rational use of medicines and health care professionals to the public. The availability of medicines is very good, very low cost of medicines is the result of state support to the national pharmaceutical industry, which is heavily subsidized. Approximately 85% of the population is covered by some form of health insurance, which subsidizes 70% of the price of the drug. Generic prescribing is essential and generic interchangeability are the foundation of the widespread use of generic medicines.	WHO operational package for monitoring and assessing country pharmaceutical situations
Cheraghali 2009	Availability, affordability, and prescribing pattern of medicines in Sudan	Sudan	LM	The total availability of EMs in public and in private pharmacies in Sudan is satisfactory. The availability of medicines to treat some common diseases such as malaria and pneumonia in children may be considered satisfactory, but the availability of medicines for the treatment of other diseases, such as pneumonia in adults, could be improved. The rate of prescribing antibiotics is high and alignment to standard treatment guidelines of common diseases such as malaria and diarrhea is small.	WHO operational package for monitoring and assessing country pharmaceutical situations

Dabare 2014	A national survey on availability, price and affordability of selected essential medicines for non-communicable diseases in Sri Lanka	Sri Lanka	LM	Availability of selected EMs is high in the public and private sector. Most of the medicines are available to individuals with the lowest income. A wide variety of generic medicines is available in the private and public pharmacies, which increases the availability of medicines.	WHO and Health Action International (WHO/HAI)
Ewen 2017	Baseline assessment of WHO's target for both availability and affordability of essential medicines to treat non-communicable diseases	Afganistan, Bolivia, Burkina Faso, Burundi, Brazil, China, Colombia, Equador, Ethiopia, Haiti, India, Indonesia, Iran, Kyrgyzstan, Lao, Lebanon, Mauritius, Mexico, Moldova, Mongolia, Nicaragua, Sao Tome et Principe, Sudan, Tanzania, Tajikistan, Uganda, Ukraine		In low-income countries, 15.2% and 18.9% of lowest-priced generics met WHO's target in the public and private sectors, respectively, and 2.6% and 5.2% of originator brands. In lower-middle income countries, 23.8% and 23.2% of lowest priced generics, and 0.8% and 1.4% of originator brands, met the target in the public and private sectors, respectively. In upper-middle income countries, the situation was better for generics but still suboptimal as 36.0% and 39.4% met the target in public and private sectors, respectively. For originator brands in upper-middle income countries, none reached the target in the public sector and 13.7% in the private sector. Across the therapeutic groups for lowest priced generics, CVD medicines in low-income countries (11.9%), and CNS medicines in lower-middle (10.2%) and upper-middle income countries (33.3%), were least available and affordable in the public sector. In the private sector for lowest priced generics, CNS medicines were least available and affordable in all three country income groups (11.4%, 5.8% and 29.3% in low-, lower-middle and upper-middle income countries respectively).	WHO and Health Action International (WHO/HAI)
Khuluza 2017	Availability and affordability of antimalarial and antibiotic medicines in Malawi	Malawi	L	Availability of the antimalarials was high in public and charity facilities (93% and 100%, respectively). However, availability of antibiotics was much lower (e.g. 40% availability of amoxicillin tablets/capsules in public health centres). Medicine prices were lower than reported from many other countries.	WHO and Health Action International (WHO/HAI)
Mendis 2007	The availability and affordability of selected essential medicines for chronic diseases in six low- and middle-income countries	Bangladesh, Brazil, Malawi, Nepal, Pakistan and Sri Lanka	LM, UM, L	Availability of medicines for treatment of chronic diseases (hypertension, hyperlipidemia) was low. Availability of benzathine benzylpenicilline (treatment of rheumatic fever) was low in Bangladesh, Nepal and Sri Lanka. Streptokinase (a thrombolytic), which significantly reduces mortality in patients with myocardial infarction was not available in all countries.	WHO and Health Action International (WHO/HAI)
Saleh 2005	Are essential medicines in Malaysia accessible, affordable and available?	Malaysia	UM	Most of the population of Malaysia has access to affordable EMs. If the medicines are procured by the private sector, availability is low. The average availability of EMs in Malaysia is very high (> 95.0%), in some areas of the region is lower e.g. Sabah, <80.0%.	WHO and Health Action International (WHO/HAI)
Saouadogo 2011	Measuring availability, affordability and management of essential medicines in public	Burkina Faso	L	Availability of hospital EMs originators in public hospitals (emergency EMs that do not exist in the form of generic) is low. The availability of generic medicines is better. The consequence is that some patients have to use the services of the private sector, where pay high prices for	WHO and Health Action International (WHO/HAI)

	hospitals of Burkina Faso			listed medicines. Some essential hospital originator medicines are not available in the private sector (for example, a solution for injections of magnesium sulphate). - There is no local production of medicines. - Generic medicines are more available than originator in all areas including rural, which proves policy of essential generic medicines successful.	
Senarathna 2011	Medicine prices, availability and affordability in Sri Lanka	Sri Lanka	LM	Generic medicines have good prices and are available. Originator medicines are more expensive and less available. The differences in prices in the private and public pharmacies were not observed. High availability of generic medicines at all times ensure availability of medicines and equality for patients. Even six years after stopping prices monitoring, prices have not increased dramatically.	WHO and Health Action International (WHO/HAI)

L – low-income, M – middle-income, LM – lower middle-income, UM – upper middle-income, H – high-income country, EMs – essential medicines, IQR – interquartile range

Table 2. Comparisons of World Health Organization Model List of Essential Medicines and National Essential Medicines Lists (n = 13 articles)

Country	Income	Inhabitants (millions)	Total health expenditure in 2014 (% BDP-a)	First NEML	Last version NEML	Total No of molecules on NEML	Total No of molecules on closest WHO EML	Total No of molecules on WHO EML and NEML*	Total No of medicines on NEML only*	Total No of medicines on WHO EML only*	Alignment index	EBM criteria used in making NEML	Public included in making NEML	Separate pediatric NEML
Bangladesh	LM	162.9	2.8	1982	-	160	160	160	-	-	1.00	-	-	-
Bosnia and Herzegovina	UM	3.8	9.6	-	2013	334[#]	414	124	164	92	0.37	declarative	no	no
Brazil	UM	207.8	8.3	1964	2012	468	374	145	339	286	0.31	-	passive	yes
Bhutan	LM	0.7	3.6	-	2007	299	-	-	-	-	-	-	-	-
Cameroon	LM	23.3	4.1	-	-	-	-	-	-	-	0.49	-	-	-
Chad	L	14.1	3.6	-	-	-	-	-	-	-	0.49	-	-	-
China	UM	1376.1	5.5	1982	2012	342	374	134	297	222	0.39	no	passive	-
Congo	L	4.6	4.3	-	2006	264	-	-	-	-	-	-	-	-
Croatia	H non-OECD	4.2	7.8	-	2012	509‡	359	188	321	42	0.37	declarative	no	no
Djibouti	LM	0.8	10.6	-	2007	218	-	-	-	-	-	-	-	-
Egypt	LM	91.5	5.6	-	2006	385	-	-	-	-	-	-	-	-
Ethiopia	L	102.4	4.9	1980	2010	-	-	-	-	-	-	-	-	-
Ghana	LM	27.4	3.6	-	-	-	-	-	-	-	0.53	-	-	-

India	LM	1311.1	4.7	1996	2011	352	374	156	275	227	0.44	yes	passive	-
Indonesia	LM	257.6	2.8	1978	2014	323	374	256	215	175	0.79	-	-	-
Kenya	LM	46.1	5.7	1981	2016	285	374	207	218	224	0.73	-	-	-
Latvia	H non-OECD	1.9	5.9	-	2007	313	-	-	-	-	-	-	-	-
Libya	UM	6.3	5	-	2006	584	347	270	314	52	0.46	no	-	-
Malawi	L	17.2	11.4	1991	2009	318	374	130	216	301	0.41	-	-	-
Malaysia	UM	30.3	4.2	1995	2014	321								
Mali	L	17.6	6.9	-	-	-	-	-	-	-	0.57	-	-	-
Mexico	UM	127.1	6.3	1984	2010	771	321	236	495	-	0.31	-	-	-
Moldova	LM	4.1	10.3	-	2006	447	-	-	-	-	-	-	-	-
Nepal	L	28.9	5.8	1986	2011	321	-	-	-	-	-	-	-	-
Nigeria	LM	182.2	3.7	1987	-	-	-	-	-	-	0.61	-	-	-
Papua New Guinea	LM	7.6	4.3	-	2012	-	-	-	-	-	-	-	-	-
Philippines	LM	100.7	4.7	-	2008	627†	374	283	439	148	0.45	-	yes	-
Senegal	UM	15.1	4.7	-	-	-	-	-	-	-	0.43	-	-	-
South Africa	LM	54.5	8.8	1996	2012	339	374	201	416	230	0.59	-	-	yes
Sri Lanka	LM	20.7	3.5	-	2006	335	-	-	-	-	-	-	-	-
Tanzania	L	53.5	5.6	1991	2013	440	374	186	427	245	0.42	-	-	-
Uganda	L	39.1	7.2	-	-	-	-	-	-	-	0.63	-	-	-
Yemen	LM	26.8	5.6	-	2007	309	-	-	-	-	-	-	-	-

L – low-income, UM – upper middle-income, LM – lower middle-income, H non-OECD – high, not members of Organisation for Economic Co-operation and Development, GDP – gross domestic product, EML – essential medicines list, WHO – World Health Organization, EMB – Evidence-based medicine. Alignment (adherence) index – proportion of medicines from the WHO Model List of Essential Medicines on each national EML to the total number of medicines on national EML.

*Including duplicates for different indications.

†Basic and supplementary list.

‡Medicines from 9 ATC classes.

Figure 1. Flow chart of the scoping literature review.